River Semington – West Lavington

An advisory visit carried out by the Wild Trout Trust – December 2009

1. Introduction

This report is the output of a Wild Trout Trust advisory visit undertaken on the headwaters of the Semington Brook. The advisory visit was undertaken at the request of Caroline Holloway, who owns the land where the Semington Brook rises just upstream of the village of West Lavington in Wiltshire.

Ms. Holloway is very keen to manage the land and stream in a way that is compatible with nature conservation objects and wishes to explore what, if any, measures that can be taken to improve habitats for wild brown trout.

Comments in this report are based on observations on the day of the site visit and discussions principally with Caroline Holloway and Ellie Gill, who is a local resident and who has an interest in the ecology of the stream.

Throughout the report, normal convention is followed with respect to bank identification i.e. banks are designated Left Bank (LB) or Right Bank (RB) whilst looking downstream.

2. Catchment overview

The Semington Brook is a headwater tributary of the Bristol Avon. It rises from a chalk aquifer on land owned by Ms. Holloway and initially displays many of the characteristics associated with a chalk/limestone stream. The ecological status of the stream can be compromised by low flows in its upper reaches and the stream has been highlighted as one where there is “no water available” under the Environment Agency’s Catchment Abstraction Management Plan published for the Bristol Avon catchment.

A wild trout population is known to exist in the short reach from its source down to below West Lavington. Further downstream, where the gradient flattens just below the sewage treatment works at Littleton Panel, the stream passes over a mainly clay geology where the fish population is dominated by mixed coarse fish species.

3. Site overview

The site inspected consisted of a series of at least four old on-line lakes or broadwaters with short interconnecting sections of stream covering a length of approximately 0.5km. The lakes are fed from a network of springs bubbling up from the chalk aquifer. The dams and structures forming the lakes probably date back to the latter half of the 18th or early 19th century when the construction of landscaped on-line ponds was very much in fashion. The lakes are now slowly succeeding back to marshland, with encroaching reed and willow scrub slowly marching their way into areas that were once open water habitats.

The volume of flow exiting the bottom pond was quite substantial and quickly consolidates into a delightful water course which then makes its way on down the valley for another 0.5km to the downstream boundary of the property.

The lakes are not stocked and are not used as fisheries but several trout were observed attempting to spawn at the inflow to the third pond where a thin, shallow gravel shoal has formed. Small trout were also seen in a pool near the bottom boundary.

4. Habitat Assessment

Springs at the very source of the Semington are ephemeral and at the time of the inspection had only recently started to flow. Two interconnected lakes have been constructed virtually on the source of the springs. Both lakes essentially dry up following drought conditions and there is little scope to restore any functioning stream at this location. Indeed the main value of the site is probably associated with the transitional nature of the lakes back to a marshy bog. This type of habitat is comparatively rare, particularly in lowland southern England and will support a specialised community of plants and invertebrates as well as providing a valuable habitat for a range of bird species. The unreliable and ephemeral nature of the water supply means that this top section has no scope to develop any sustainable fish populations.

Pic 1. Source of the Semington Brook just above the first of the series of on-line lakes

Below the first two interconnected ponds the stream drops down a steep gradient and over several stone weirs (pic 2) that look to have been installed to push the water down parallel channels before dropping into the neck of the next pond. The whole site is set down in a steep-sided valley and was probably part

of a large ornamental garden. The stone weirs are in places backing up the stream and restricting the development of any natural morphology by slowing down upstream water velocities. Consolidating the flow into a single channel and lowering or removing the central sections of the weirs would help to improve habitats for flow-loving species within the stream, however, the heritage value of the structures should be explored further before undertaking any modifications. Carrying out this work at this precise location is unlikely to benefit trout populations unless the habitat connectivity issues are addressed further downstream as well. There are two further substantial dams a short distance downstream that will restrict any significant upstream migration for trout and other flow-loving fish species so carrying out improvement works here in isolation from the rest of the site will not improve the fishery potential of the stream as a whole.

Pic 2. Stone weir below the top lakes. Removing the central stone will improve habitat quality in the stream above.

Further downstream the channel starts to widen and the stream again loses all velocity as it melts into the neck of a third lake. This particular lake does not completely dry up but does shrink to a small area of open water just above the dam. The dam itself is a large structure (pic 3) of at least 3m in height. Set into the dam is a culvert with a sluice gate which is drawn following heavy rainfall events to prevent overtopping of the structure. Below the dam the stream forms a nice shallow channel.

Two brown trout were observed attempting to spawn on a thin layer of gravels just a few metres downstream. These fish looked to be sizable wild fish which probably reside in the bottom lake below. Although migration is possible to this point an assessment of the bottom dam downstream suggested that only large

fish under exceptional circumstances could negotiate the structures to reach the point where the fish were observed.

Pic 3. The large dam of the third lake has a sluice to prevent the dam from over topping. Two trout were observed getting ready to spawn on the shallow gravels in the foreground.

At the outlets to the bottom pond the Semington Brook is properly formed into a small stream (cover picture). Habitat quality on this section for trout was considered to be good, with the stream providing a nice range of habitats for all life stages. A particular feature of the bed substrate was the presence of the colonial algae (*Hildon brandia)* (pic 4). This red algae is closely related to a marine species and from my observations of southern rivers is a comparatively rare find.

Colonial red algae *Hildon brandia* with a fine coating of water moss *Fontinalis*

This particular section of the Semington Brook appeared to have received little or no maintenance work. The presence of some pieces of large woody debris and the comparatively dense shading provided some excellent refuge for small trout from predation pressures and has helped to scour some holding pots in the stream bed with associated gravel bars.

It is very likely that considerable numbers of trout migrate up to this section in the autumn looking for suitable spawning sites. It is not known if there are any significant barriers to upstream migration below this point but if not, this would make this section even more valuable as an important habitat capable of producing substantial numbers of trout which will then drop back to populate sections further downstream.

One possible bottleneck to successful trout production could be the extent and quality of the gravel substrate found within this section. Spawning gravels are usually alluvial river valley deposits and are often replenished in small streams by the action of bank and river erosion. The fact that this section of stream is so near to its source and with the network of lakes above, there seems to be little scope for fresh gravels to be freed up and made available as a spawning medium. In addition those gravels that were found showed signs of natural concretion associated with deposits of calcium carbonate or “tufa”. When gravels become glued together it is extremely difficult for trout to break the crust and form the natural depression required to lay down a productive nest or redd. These areas are then covered by the trout with loose gravel through the action of beating their tail. A hard cemented crust to the surface of the gravels therefore makes it very tough going for the trout.

Options for enhancing trout holding and spawning habitat are discussed in more detail in section 5.

5. Conclusions

The headwaters of most streams are usually very important habitats for brown trout. The section of the Semington, which is divided up into a series of on-line ponds, has very limited scope for providing good quality brown trout habitat. The gradient is there but removing the structures and restoring a natural functioning stream channel is likely to be difficult and hugely expensive. The best course of action is to manage the lakes for what they currently are, a series of shallow wetlands which support a range of plants and invertebrate species associated with ephemeral wetland habitat.

To reduce the requirement for frequent visits to check on flows and pond levels following prolonged heavy rainfall it might be worth considering the installation of a high level spillway on top of some of the structures. This will provide some flow stability and ensure that if any of the ponds overtop then water can be safely channelled over the structures without fear of damage to the fabric of the dam. Currently when the sluices are opened a large plug of sediment rich water is likely to be flushed down onto sections of gravel habitat where trout may be spawning or have just spawned, which will damage trout egg or alevin survival.

The lower section, where the stream exits the bottom pond has lots of scope to provide a sustainable habitat for wild brown trout. This section could be improved further with a focus on providing good quality holding and spawning habitat. The introduction of more large woody debris (LWD) is recommended. The presence of LWD has been shown to be extremely important in several respects:

- An increase in the variety of flow patterns, depths and localised velocities.
- Development of high in-channel physical habitat diversity
- Significant benefits to the control of run-off at the catchment scale. Woody Debris helps regulate the energy of running water by decreasing the velocity. Thus the 'travel time' of water across the catchment is increased.
- Provides organic material which acts as food and habitat for invertebrates

LWD is a general term referring to all wood naturally occurring in streams including branches, stumps and logs. Almost all LWD in streams is derived from trees located within the riparian corridor. Streams with adequate LWD tend to have greater habitat diversity, a natural meandering shape and greater resistance to high water events. Therefore LWD is an essential component of a healthy stream's ecology and is beneficial by maintaining the diversity of biological communities and physical habitat.

Traditionally many land managers and riparian owners have treated LWD in streams as a nuisance and have removed it, often with uncertain consequences. This is often unnecessary and harmful: stream clearance can reduce the amount of organic material necessary to support the aquatic food web, remove vital in-stream habitats that fish will utilise for shelter and spawning and reduce the level of erosion resistance provided against high flows. In addition LWD improves the stream structure by enhancing the substrate and diverting the stream current in such a way that pools and spawning riffles are likely to develop. A stream with a heterogeneous substrate and pools and riffles is ideal for benthic (bottom dwelling) organisms as well as for fish species like wild trout.

Advice on the use of LWD to create better quality trout habitat is set out in the WTT Chalkstream Habitat Manual which is available from our office address and on our website (www.wildtrout.org).

Where spawning gravels currently exist it may help to boost trout production by breaking up and loosening the gravels each autumn before trout spawning commences in the November to January period. This work can be undertaken using hand tools such as fencing spikes and rakes or by using hand held pressure pumps to blast the sediments out of the gravels. This creates optimum conditions for spawning and will ensure that a much higher percentage of eggs survive to become fry. A demonstration of gravel cleaning techniques can be arranged via a Wild Trout Trust Practical Visit (details in the "Make it Happen " section).

Gravel cleaning using a backpack leaf blower

If the installation of LWD and a programme of gravel cleaning reveals that the depth and quality of available gravels is lacking, then it is worth considering a project to import new gravels form an external source. Techniques and advice on how to undertake gravel installation is available from the WTT or via specialised contractors.

It is a legal requirement that some works to the river may require written Environment Agency consent prior to undertaking any works, either in-channel or within 8 metres of the bank. Any modifications to hard defences will require a land drainage consent on any river designated as "main river". Advice can be obtained from the EA's Development Control Officer.

6. Recommendations

- Allow the process of natural succession to wetland to continue in the on-line ponds.

- Before considering any modifications to structures check to see if they have any heritage or archaeological significance.

- Consider the installation of emergency spillways on the dams of the lower ponds to negate any requirements for sluice operation. This action will provide better flow stability and avoid the mobilisation of sediments settled within the ponds.

- Carry out a simple project to install LWD flow deflectors in the channel below the bottom pond to create enhanced holding and spawning habitat.

- Implement a programme of autumn gravel cleaning to ensure that available spawning habitats are in tip top condition prior to spawning activity.

- If following the above works it is deemed that the gravels are too thin and scarce then consider the construction of two or three imported gravel spawning riffles.

7. Making it happen

There is the possibility that the WTT could help to start an enhancement programme. Physical enhancement works could be kick-started with the assistance of a WTT 'Practical Visit' (PV). PV's typically comprise a 1-3 day visit where approved WTT 'Wet-Work' experts will complete a demonstration plot on the site to be restored. This will enable project leaders and teams to obtain on the ground training regarding the appropriate use of conservation techniques and materials, including Health & Safety equipment and requirements. This will then give projects the strongest possible start leading to successful completion of aims and objectives.

The WTT can fund the cost of labour (two/ three man team) and materials (max £1800). Recipients will be expected to cover travel and accommodation expenses of the contractor.

There is currently a big demand for practical assistance and the WTT has to prioritise exactly where it can deploy its limited resources. The Trust is always available to provide free advice and help to clubs, syndicates and landowners through guidance and linking them up with others that have had experience in improving trout fisheries.

Acknowledgement

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